



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,600	10/02/2003	Mark A. Meltser	8540G-000145	8227

27572 7590 05/10/2006

HARNESSE, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
----------	--------------

1742

DATE MAILED: 05/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/677,600	Applicant(s) MELTSER, MARK A.	
	Examiner Harry D. Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 and 43-45 is/are pending in the application.
- 4a) Of the above claim(s) 1-18, 36-39 and 43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-35, 44 and 45 is/are rejected.
- 7) ☒ Claim(s) 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/2/03, 12/2/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of group II (claims 19-35 (originally) plus new claims 44 and 45) in the reply filed on 23 March 2006 is acknowledged. The traversal is on the ground(s) that there is no serious burden for searching both groups on the Examiner. This is not found persuasive because these inventions have acquired a separate status in the art in view of their different classification. Thus, restriction for examination purposes as indicated is proper.

The requirement is still deemed proper and is therefore made FINAL.

With respect to Applicant's amendment to claim 1 to avoid the reasoning previously put forth to show that groups I and II were independent and distinct, claims 1 and 36 as compared to claim 19 (plus new claim 45) are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process, such as the production of high pressure hydrogen and high pressure chlorine as shown by Vandenberg (US 6,554,978). Thus, claims 1 and 36 are still considered to be independent and distinct from claims 19 and 45 and are withdrawn from consideration. With respect to the limitation of system claims 19 and 45 of "said electrolyzer operable to convert water and electricity into a hydrogen-containing stream on said cathode side

Art Unit: 1742

and an oxygen-containing stream on said anode side", the electrolyzer of Vandenberg was operable in this manner, should water have been fed to the electrolyzer, instead of a NaCl aqueous solution (brine) (see col. 6, lines 3-6).

Claim Objections

2. Claim 20 is objected to because of the following informalities: in line 3, the first instance of "side" should be "said". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 19-35, 44 and 45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant's specification describes the pressure of the pressurized water source as being "at high pressures, such as 5,000-10,000⁺ psi" (paragraph 18). Thus, Applicant's specification does not show that, at the time of the invention, the claimed ranges of "thousands of pounds per square inch" and "greater than about 1,000 psi" were realized by Applicant.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1742

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 19 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by da Rosa (US 4,107,277) with evidence from LaConti et al (US 4,457,823).

Da Rosa anticipates the invention as claimed. Da Rosa teaches (see figure and col. 2, lines 45-59) an electrolyzer system including a pressure vessel having an electrolyzer in the interior cavity of the pressure vessel, a pressurized water source (pump) operable to supply water at pressures of 150-1000 atmospheres (~2200~14700 psi) and a flow path from the water source into the interior cavity to pressurize the interior cavity with the water. The electrolyzer system utilized the water and electric current to produce a hydrogen stream and an oxygen stream.

Da Rosa merely describes the electrolyzer as a "Solid Polymer Electrolyte Cell" sold by General Electric, and fails to teach the details of the electrolyzer.

LaConti et al teach (see col. 1, lines 12-33 and figures 1 and 2) such solid polymer electrolyte cells, and show that there was an anode side and a cathode side and that water was fed to both sides of the solid polymer membrane.

Regarding claim 25, the source of pressurized water was a pump.

Regarding claim 26, the solid polymer electrolyte cell included an anode side and a cathode side.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1742

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 19-35, 44 and 45 rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,690,797) in view of Sioli (US 4,758,322).

Harada et al teach (see figure 2) an electrolyzer system including a pressure vessel (7) with an electrolyzer (1) located within the pressure vessel, a pressurized water source (11) and a flow path (7B) to feed the pressurized water into the pressure vessel. The pressurized water is supplied to both anode and cathode sides of the electrolyzer and the electrolyzer uses the water and electric current to produce hydrogen and oxygen.

Harada et al does not teach the maximum pressure at which the gases maybe produced (equivalent to the pressure within pressure vessel (7)), and only mentions that the differential pressure between anode and cathode sides is kept below 0.5 kg/cm^2 (~7 psi). However, since Harada et al clearly suggest that the pressure of the produced gas was increased, one of ordinary skill in the art would have expected the pressures at which the system operated (i.e.-the pressure within the pressure vessels (7 and 32)) to be capable of operating at at least 1000 psi.

The difference between the disclosure of Harada et al and the presently claimed invention is that Harada et al teach that the electrolyzer was set-up such that the high-pressure water was fed only to the anode side of the electrolyzer and not both sides. However, it should be noted that Harada et al do teach (see col. 21, lines 46-52) that any electrolyzer was suitable for use, not just the one described in the specification.

Sioli teaches (see figures 2, 3 and 8 and Example 2) that a conventional set-up for water electrolyzers was to flow water on both sides of the solid polymer membrane instead of merely only to one side of the membrane.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the system of Harada et al to have used a conventional electrolyzer that fed water to both sides of the membrane instead of just the anode side because the multiple cell electrolyzer of Sioli provided the advantage of increased production capacity.

Regarding claim 20, Harada et al in view of Sioli teach that each side of the electrolyzer would have included an inlet and an outlet, wherein each inlet received water and the first side outlet routed water out of the pressure vessel and the second side outlet routed water out of the electrolyzer and into the pressure vessel.

Regarding claims 21 and 22, the system of Harada et al included a pressure retaining valve (44) in the first flow path for controlling (regulating) the pressure of the first side stream.

Regarding claim 23, the system of Harada et al further included a separator (32) located in the first flow path and the valve for controlling the pressure, the separator allowing separation into water and gas through first and second outlets. It would have been obvious to have recycled the water from the separator to the pressure vessel in order to have reduced wasting of water.

Regarding claim 44, the valve 44 was a closed-loop regulator that operated by selectively allowing gas in the separator (32) to flow through the valve by comparing the differential pressure across the valve. Although Harada et al fail to teach a pressurized

Art Unit: 1742

storage device located downstream of the regulating valve (44), Harada et al does teach that 41A is a gas supply port for delivering hydrogen gas to a site where hydrogen is consumed. One of ordinary skill in the art would have found it obvious to have added a pressurized storage device to the system to permit a buffer of hydrogen gas to be stored or to allow batch-wise transporting of the hydrogen in canisters.

Regarding claim 24, Harada et al teach a pump (16) feeding pressurized water to the electrolyzer. However, Harada et al do not teach that the pump was located within the pressure vessel. One of ordinary skill in the art would have found it obvious to have relocated the pump (16) from an external position to the interior of the pressure vessel (7) for the purpose of reducing the footprint of the system to reduce the amount of space necessary for the system.

Regarding claim 25, the source of pressurized water is a pump.

Regarding claim 26, the electrolyzer included an anode side and a cathode side.

Regarding claim 27, Harada et al teach regulating the flow of water into the electrolyzer through a pump 16.

Regarding claim 28, the system of Harada et al included a level indicator (21) and that the source of pressurized water selectively feeds water based on the level detected.

Regarding claim 29, Harada et al teach a pressure indicator (29). However, the indicated pressure did not permit selective supplying from the source of pressurized water. However, one of ordinary skill in the art would have found it obvious to have selectively supplied more pressurized water to the pressure vessel if the pressure within

Art Unit: 1742

the vessel (the pressure indicated by the pressure indicator) dropped below a minimum acceptable gas pressure to thereby increase the operating pressure.

Regarding claim 30, the system of Harada et al included a flow path (24) from an upper portion of the pressure vessel and a pressure regulating valve (28).

Regarding claim 31, the pressure regulating valve and the source of pressurized water controlled the pressure inside the pressure vessel (7).

Regarding claims 32 and 33, the system of Harada et al would have been capable of operating at the claimed pressures in order to produce hydrogen and oxygen streams at the desired pressure. The prior art recognized that electrolyzers under pressure, with low differential pressures, were capable of operating at extremely high pressures, such as 150-1000 atmospheres as evidenced by da Rosa.

Regarding claim 34, the system of Harada et al operated with a pressure differential of less than 0.5 kg/cm^2 (~7.11 psi).

Regarding claim 35, the electrolyzer of Harada et al was submerged within the water in the pressure vessel.

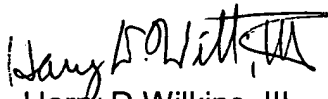
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1742

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw